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# Comparison of four methods for assessment of severity of hand eczema

Tove Agner<sup>1</sup>, Jacob Mutanu Jungersted<sup>2</sup>, Pieter-Jan Coenraads<sup>3</sup> and Thomas Diepgen<sup>4</sup>

<sup>1</sup>Department of Dermatology, University of Copenhagen, Bispebjerg Hospital, 2400 Copenhagen, Denmark, <sup>2</sup>Department of Dermatology, University of Copenhagen, Roskilde Hospital, 4000 Roskilde, Denmark, <sup>3</sup>Department of Dermatology, University of Groningen, University Medical Centre Groningen, Groningen 9700 RB, The Netherlands, and <sup>4</sup>Department of Clinical Social Medicine, Occupational and Environmental Dermatology, University of Heidelberg, 69115 Heidelberg, Germany

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## Summary

**Background.** Several instruments for the assessment of the severity of hand eczema and health-related quality of life (HR-QoL) related to hand eczema have been developed.

**Objectives.** The aim of the present study was to evaluate the correlation between frequently used methods.

**Methods.** Consecutive patients with current hand eczema from three different centres participated in the study. Severity of hand eczema was assessed with the Hand Eczema Severity Index (HECSI), the Physician Global Assessment (PGA), the Clinical Photo Guide, and the Dermatology Life Quality Index (DLQI).

**Results.** One hundred and nineteen patients with hand eczema were included in the study. All six pairwise correlation coefficients between the tested methods were highly statistically significant. Correlation was highest between the HECSI and the PGA ( $r = 0.82$ ), and weakest, although still statistically significant, between the DLQI and the other three severity scores ( $r$  between 0.30 and 0.45). Age and frequency of eruptions did not influence the correlations. With respect to sex, there was a tendency for correlation between methods to be higher for men than for women.

**Conclusion.** We found an overall positive correlation between the four severity assessments applied. As the weakest correlation was found between the DLQI and the other methods, it is suggested that measurement of HR-QoL should be included for assessment of the severity and consequences of hand eczema, but the finding also indicates that a disease-specific tool for evaluation of HR-QoL in hand eczema patients is needed.

Standardized assessment of the severity of hand eczema is important in clinical trials, and also in the daily clinic when monitoring the effect of treatment. Severity may be assessed objectively by healthcare personnel, during visits to the clinic, or subjectively by the patient. The assessment may include only the physical symptoms (degree of eczema and frequency of eruption), or also

the consequences of the disease, that is, health-related quality of life (HR-QoL). The choice of method for severity assessment depends on which aspects are to be monitored, and also whether the assessment is to be based on a visit to the healthcare system or should be performed by use of a questionnaire. Significant differences between objective severity assessment by healthcare personnel and subjective assessment by patients have previously been reported (1).

Several instruments have been developed for assessing the clinical severity of hand eczema (2–6). These instruments have mainly been used in epidemiological and clinical studies, to evaluate the effect of treatment or prevention efforts, but they may also be used in daily clinical practice to follow the development of the eczema.

*Correspondence:* Tove Agner, Department of Dermatology D 40, Bispebjerg Hospital, 2400 Copenhagen NV, Denmark. Tel: +45 35 31 34 86. E-mail: t.agner@dadlnet.dk

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During the last decade, there has been an increased focus on research in HR-QoL. This research incorporates the patient's personal perspective, including the impact of disease on everyday life activities and life satisfaction. Generic questionnaires, giving a global assessment of HR-QoL (7–9), as well as dermatology-specific questionnaires designed to assess the impact on quality of life (QoL) in different skin conditions, are available (10, 11), but, at present, a disease-specific questionnaire for hand eczema, focusing only on the specific health-related problems in this group, has not been developed.

The aim of the present study was to evaluate the correlation between frequently used methods for assessment of hand eczema severity. We compared three severity scores – the Hand Eczema Severity Index (HECSI) (2), the Physician Global Assessment (PGA) (4), and the Clinical Photo Guide (5, 6) – and one HR-QoL instrument, the Dermatology Life Quality Index (DLQI) (10). The primary purpose of the study was to explore the degree of correlation between the four methods. In addition, it examined whether the correlations are dependent on age, sex, frequency of eruptions, and diagnostic subgroup. The study was performed in three centres, and differences between centres were assessed.

## Material and Methods

Patients with hand eczema referred to the outpatient clinic at the Department of Dermatology, Roskilde Hospital, Denmark, the Department of Dermatology Heidelberg, Germany, and the Department of Dermatology, Amsterdam, The Netherlands were included in the study. Patients were recruited consecutively in the period February–August 2007, and all had active eczema when they visited the clinic. Objective disease severity assessment was performed by the doctors involved, by means of the HECSI score and the PGA score. Subjective assessment of severity was performed by the patients with the Clinical Photo Guide. HR-QoL was scored by the patient with the DLQI. The doctors did not have access to the scorings performed by the patients. In addition to age and sex, information on personal atopic eczema and psoriasis was recorded. Frequency of eruptions of hand eczema was registered as (i) less often than four times per year, (ii) one eruption every 3 months, (iii) more than one eruption every 3 months, and (iv) persistent eruptions. Occupational relationship of the eczema was registered. All patients underwent patch testing, contact allergies were recorded, and all patients had a subdiagnosis according to a previously suggested classification (12) (Table 1).

The HECSI is a scoring system developed for the clinical assessment of hand eczema. The score depends on the

severity of six different morphologies (redness, scaling, infiltration, oedema, fissures, and vesicles) and on the total area involved (2), and the severity is assessed as a number between 0 and 360.

The PGA score was coded as: 1 = almost clear, 2 = mild, 3 = moderate, and 4 = severe (4).

The Clinical Photo Guide is an instrument for severity assessment based on comparisons of the hand eczema of the patient with four rows of photographs showing increasing intensity of eczema (5, 6). The eczema is graded by the patient with the number of the row corresponding to the severity of the actual eczema (score 1–4).

The DLQI is a simple 10-question validated questionnaire that has proven to be valuable in patients with hand eczema with respect to evaluation of HR-QoL (10). The 10 questions cover the effect of skin disease on physical, social and functional aspects of life over the last week. Validated translations of the original DLQI questionnaire into Danish, German and Dutch were used. The score was coded as a number between 0 (best QoL) and 30 (worst QoL) with respect to dermatological disease.

## Statistical Methods

The scores obtained with the four methods cannot be assumed to follow a normal distribution, and statistical methods based on rank order were used. Spearman's correlation coefficient ( $r_s$ ) provides a quantitative estimate of the agreement between the ordering of the scores obtained with two methods, such that identical orderings gives  $r_s = 1$  or  $r_s = -1$ , depending on whether increasing scores with one method correspond to increasing or decreasing scores with the other.  $r_s = 0$  indicates no correlation. Under the null hypothesis,  $r_s$  is approximately normally distributed with mean 0 and variance  $1/(n-1)$  where  $n$  is the number of observations, and the significance of the correlation can be tested by a chi-square test with one degree of freedom,  $\chi^2 = r_s^2(n-1)$ . Under the alternative hypothesis, it is possible to compare values of  $r_s$  after using Fisher's transformation,  $z = 1/2 \log[(1 + r_s)/(1 - r_s)]$  with variance  $n-3$ . In this way, it is possible to test the null hypothesis of equal values of  $r_s$  from different groups. Differences between continuous or ordered variables from the three centres were compared by means of the Kruskal–Wallis test based on ranks, and the distributions of patients in non-ordered categories were tested by means of chi-square tests. Owing to the many tests of the differences between centres, it is appropriate to apply the Bonferroni adjustment of the usual significance limit (0.05), which becomes  $0.05/12 = 0.0042$ .

**Table 1.** Summary of the recorded variables

Variable	Centre			<i>p</i> -value
	DK (47)	NE (22)	DE (50)	
Sex: female/male	30/17	9/13	21/29	NS
Age (years), median (range)	54 (18–71)	44 (19–66)	44 (17–63)	0.0069
Atopic skin disease	9	9	10	NS
Psoriasis: yes/no	3	0	0	NS
Eruptions				NS
Up to three times per year	1	0	2	
One eruption every 3 months	3	2	3	
More than one eruption every 3 months	16	6	8	
Persistent eruptions	27	14	37	
Occupational hand eczema	22	4	45	<0.0001
Contact allergy	27	8	28	0.0061
Diagnosis				0.0002
ACD	3	0	3	
ACD + ICD	9	0	8	
ICD	12	1	12	
AHE	2	3	5	
AHE + ICD	1	0	6	
Vesicular	2	7	4	
Hyperkeratotic	12	9	2	
Other/unspecified	6	2	10	
HECSI score: median (range)	20 (2–196)	18 (5–130)	21 (0–90)	NS
PGA: median (range)	3 (1–4)	3 (1–4)	3 (1–4)	NS
Clinical Photo Guide: median (range)	2 (1–4)	3 (1–4)	2 (1–4)	NS
DLQI: median (range)	7 (0–31)	7 (1–23)	5 (0–22)	NS

ACD, allergic contact dermatitis; AHE, atopic hand eczema; DE, Germany; DK, Denmark; DLQI, Dermatology Life Quality Index; HECSI, Hand Eczema Severity Index; ICD, irritant contact dermatitis; NE, The Netherlands; PGA, Physician Global Assessment.

Owing to the many tests of the differences between centres, it is appropriate to apply the Bonferroni adjustment of the usual significance limit (0.05), which becomes  $0.05/12 = 0.0042$ . This means that only occupational allergy and diagnosis differ significantly between centres.

## Results

A total of 119 patients with hand eczema were included in the study: 47 from Denmark, 22 from The Netherlands, and 50 from Germany. Summary statistics for the various recorded variables for each centre are given in Table 1. With respect to differences between centres, only numbers of occupational cases and the distribution of diagnoses differed significantly (Table 1). The distributions of the four scores (HECSI, PGA, Clinical Photo Guide, and DLQI) did not show any significant differences between centres. The correlations between the four methods are given in Table 2. All six pairwise correlation coefficients were highly statistically significant. The largest value was between the HECSI and the PGA, and the three smallest values of  $r_s$  were those between the DLQI and the other three methods. The correlation between the HECSI score and the DLQI score is shown in Fig. 1.

The homogeneity of correlation between methods between the centres was tested by statistical comparison of the  $r_s$  values for each centre, and no significant difference was found by means of a chi-square test of homogeneity

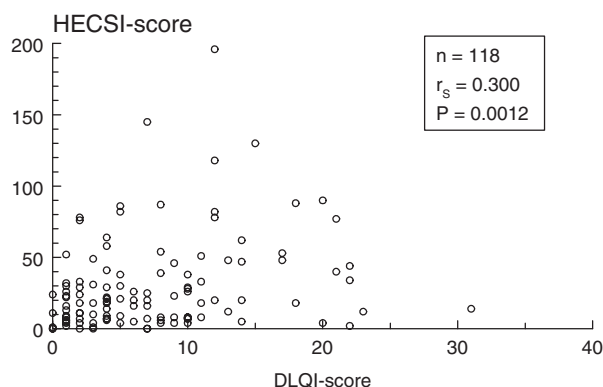
**Table 2.** Pairwise rank correlations  $r_s$  between the four methods

Comparison	$r_s$	<i>p</i> -value
HECSI–PGA	0.82	<0.0001
PGA–Clinical Photo Guide	0.65	<0.0001
HECSI–Clinical Photo Guide	0.50	<0.0001
DLQI–HECSI	0.30	<0.0012
DLQI–PGA	0.45	<0.0001
DLQI–Clinical Photo Guide	0.38	<0.0001

DLQI, Dermatology Life Quality Index; HECSI, Hand Eczema Severity Index; PGA, Physician Global Assessment.

The lowest values were found for correlations involving the DLQI.

( $p > 0.05$ ). The homogeneity of  $r_s$  values between age groups was tested, with the participants divided into three age groups defined as tertiles: 17–40, 41–54 and 54–71 years. No significant differences were found in the correlations between the methods in the different age groups ( $p > 0.05$ ). With respect to differences in correlation between methods in males and females, data are given in Table 3. None of the six correlations showed statistically significant differences between males and females. Nevertheless, it is noted that values of  $r_s$  for



**Fig. 1.** Correlation between Hand Eczema Severity Index (HECSI) score and Dermatology Life Quality Index (DLQI) score.

**Table 3.** Homogeneity of  $r_s$  between males and females for the different methods

Comparison	Males, $r_s$	Females, $r_s$	$p$ -value
HECSI–PGA	0.86	0.77	0.22
PGA–Clinical Photo Guide	0.71	0.60	0.32
HECSI–Clinical Photo Guide	0.59	0.40	0.19
DLQI–HECSI	0.37	0.24	0.46
DLQI–PGA	0.55	0.38	0.26
DLQI–Clinical Photo Guide	0.54	0.29	0.11

DLQI, Dermatology Life Quality Index; HECSI, Hand Eczema Severity Index; PGA, Physician Global Assessment.

Lower values were found for females, and especially for correlations involving the DLQI.

males in all six cases were higher than the corresponding values for females (Table 3).

It was also considered of interest to analyse whether the correlation between the methods was dependent upon the frequency of eruptions. When adjustment for performing six analyses was made, no significant differences in correlations between methods were found according to eruption frequency.

## Discussion

A statistically significant correlation was found between all four methods of severity assessment.

It is, however, very clear that the correlations between the three severity scores – the HECSI, PGA, and Clinical Photo Guide – are better than those between severity scores and HR-QoL (DLQI). This observation is not surprising, as the three severity scores are directly focused on the state of the eczema, whereas the HR-QoL score also takes into account other aspects. However, it is important to be aware of the difference in the future assessment of hand

eczema. If severity measures are applied alone, physical, social and functional aspects of life will be missing. The highest correlation was found between the HECSI and the PGA, both performed by the doctor and therefore likely to correlate. However, a low correlation was found between the DLQI and the Clinical Photo guide, both performed by the patient, further indicating that different aspects are being measured by these two instruments. This is in agreement with a previous study reporting that the burden of the disease with respect to hand eczema has a greater impact than the visible aspects of the disease (13). Another reason for the weaker correlations between DLQI and the other methods could be that the HECSI, PGA and Clinical Photo Guide are directed specifically at hand eczema, whereas the DLQI has been developed for the assessment of HR-QoL in skin diseases as such.

The correlation was independent of age. A recent study on atopic dermatitis also found increasing disease severity to be associated with greater impairment in QoL for all age groups (14). In the present study, the correlations between the four methods under evaluation were independent of frequency of eruptions. This finding is probably influenced by the fact that only patients with active eczema were included in the study, meaning that all patients at the time of evaluation had a flare-up, which could be objectively confirmed. With respect to dependency on sex, this was not statistically confirmed, but there was a trend showing better correlation for men than for women for all comparisons, which was most pronounced for comparisons between the DLQI and the other methods. In previous studies, a difference in DLQI score between males and females has been reported, with an increased DLQI score in women despite more severe eczema in the mail group as assessed by the HECSI score (15), indicating that the correlation between the HECSI and the DLQI may be influenced by sex. It is most likely that the tendency for women to be more negatively influenced on their QoL by the eczema than males is again reflected here. In contrast, a recent study including patients with psoriasis found the effect of stigmatization on QoL to be similar for both sexes (16).

Testing of the correlations between the four methods, which are all frequently used for assessment of the severity and burden of hand eczema, has not previously been reported in the same group of patients. Another strong part of our study is the fact that there are similar results in three different centres and countries. The patients in the present study were recruited from tertiary referral centres, and the HECSI and DLQI values indicate that the hand eczema cases were moderate to severe. We have no evidence that the conclusions drawn from this study can necessarily be applied to milder cases of hand eczema.



In conclusion, we found an overall positive correlation between the four severity assessments applied, three severity scores and one HR-QoL score. The weakest correlation was found between the DLQI and the other methods. This underlines the importance of including a measurement of HR-QoL, but also possibly reflects the fact that a disease-specific tool for evaluation of HR-QoL in hand eczema would be useful. The correlation was not influenced by age or frequency of eruption. With respect to sex,

there was a tendency for correlation between methods to be higher for men than for women, possibly indicating that women are more negatively influenced on their QoL by the eczema than are males.

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